IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant:	Atsushi OHMA
Title:	FUEL CELL STACK
Appl. No.:	10/582,222
International Filing Date:	11/25/2004
371(c) Date:	06/08/06
Examiner:	Stephen J. Yanchuk
Art Unit:	1795
Confirmation Number:	3852

BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
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Sir:

Under the provisions of 37 C.F.R. § 41.37, this Appeal Brief is being filed together with a credit card payment form in the amount of $540.00 covering the 37 C.F.R. 41.20(b)(2) appeal fee. If this fee is deemed to be insufficient, authorization is hereby given to charge any deficiency (or credit any balance) to the undersigned deposit account 19-0741.

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REAL PARTY IN INTEREST

The real party in interest is NISSAN MOTOR CO., LTD.

RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

STATUS OF CLAIMS

1. Claims pending: 11-20.

2. Claims cancelled: 1-10.

3. Claims withdrawn: None.

4. Claims rejected: 11-20.

5. Claims on appeal: 11-20.

A copy of claims 11-20 is provided in the CLAIMS APPENDIX.

STATUS OF AMENDMENTS

Claims 1-10 were initially pending in the application filed on June 8, 2006. However, claims 1-10 were cancelled upon filing and claims 11-20 were added as new claims in the Preliminary Amendment, also filed on June 8, 2006. In the Office Action mailed November 12, 2009, claim 12 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In response, Applicant amended claim 11. Specifically, the claim 11 term "in the interior thereof" had been interpreted as referring to the "second region" and the "second region" was specified to be "in the interior of the first region." This interpretation was not intended. Instead, the "second region" (and the "first region") were intended that both were "in the interior of the fuel cell stack." Claim 11 was not intended to refer to a positional relationship of the second region within the first region. Accordingly, to clarify this meaning, claim 11 was amended to recite: "with both the first region and the second region being located in the interior of the fuel cell stack thereof." Claim 11 was not amended for prior art purposes but to clarify an incorrect claim interpretation that the Examiner has been and is still applying.

In the Office Action mailed May 20, 2010, the rejection of claims 11-20 are maintained.

Appeal of claims 11-20 is appropriate because all of the claims have been twice rejected.

SUMMARY OF CLAIMED SUBJECT MATTER

Claims 11 is an independent claim.

Independent claim 11 is directed to a fuel cell stack comprising a plurality of stacked unit cells, wherein each unit cell comprises: a membrane electrode assembly in which gas diffusion electrodes are disposed on each side of a polymer electrolyte membrane; and a separator comprising a plurality of ribs which contact the membrane electrode assembly to realize a current collecting function, and a plurality of gas passages formed between the ribs for supplying a gas to the gas diffusion electrode, the fuel cell stack comprises a first region and a second region, with both the first region and the second region being located in the interior of the fuel cell stack thereof, the first region having a higher temperature than the second region, and at least one of the gas passages, the ribs, and the gas diffusion electrode is constituted such that a gas diffusion through the gas diffusion electrode adjacent to the first region is improved beyond the gas diffusion through the gas diffusion electrode adjacent to the second region.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

Whether the examiner erred in:

Finally rejecting claims 11-20 under 35 U.S.C. § 102, second paragraph, as being anticipated by U.S. Patent Application Publication No. 2003/0077501.

ARGUMENT

I. Claims 11-20 were rejected under 35 U.S.C. § 102, second paragraph, as being anticipated by U.S. Publ. No. 2003/0077501 to Knights et al. ("Knights").

Claims 11-20 were finally rejected under 35 U.S.C. § 102, second paragraph, as being anticipated by U.S. Publ. No. 2003/0077501 to Knights et al. (hereafter "Knights"). *See* Final Office Action dated May 20, 2010 at page 2-4.

Concerning claim 11, the Examiner considers that claim 11 recites a separator comprising ribs wherein it is allegedly commonly known that the separator is also defined as a bi-polar plate or a plate between the electrode-membrane-electrode assembly and the ribs are entities forming a gas or fluid flow channel. The Examiner also considers that the specification states that the claim to temperature variation is due to non-uniformities in the gas flow path and the coolant changes, wherein Knights allegedly teaches such limitations, such as temperature dependency based on sectional area. The Examiner further states that Knights discloses an electrochemical fuel cell having reactant flow passages with non-uniform design to increase reactant access to adjacent fluid distribution layer at the outlet region as compared to the inlet region (Abstract); discloses a membrane with electrode on opposite sides (paragraph 4), the plurality of cells (Description, Fig. 3); discloses at least a first region and a second region wherein temperatures of the first region are higher due to change of channel structure of the flow field (Fig. 4-6); and the gas diffusion is improved by the embodiments of Fig. 4-6, pointing specifically Fig. 4 wherein the reactant flow passage widens (paragraph 32).

Applicant respectfully traverses the claims are not anticipated for the following reasons and other reasons that will become apparent.

II. The Examiner is Applying an Incorrect Claim Interpretation to Claim 11.

The Examiner has been applying an incorrect claim interpretation to claim 11. Specifically, the claim 11 term "in the interior thereof" has been interpreted as referring to the "second region" and that the "second region" is to be specified to be "in the interior of the first region." Instead, the "second region" (and the "first region") were intended to be interpreted as both being "in the interior of the fuel cell stack." Claim 11 was not intended to

refer to a positional relationship of the second region within the first region. Accordingly, to clarify this meaning, claim 11 was previously amended to recite: "with both the first region and the second region being located in the interior of the fuel cell stack thereof" (emphasis added).

III. The Knights Reference Does Not Disclose A "first region" and a "second region Located in the Interior of a Fuel Cell Stack.

Simply, Knights does not disclose a "first region" and a "second region". For this reason alone, there is no anticipation (or obviousness).

IV. Claim 11 Differs in Ways from Knights Regarding the Configurations of the Gas Passages and the Ribs, So that Gas Diffusion is Improved in the "first region" (i.e., the Higher Temperature Region)

The invention recited in claim 11 differs from the Knights disclosure in other ways, so there is no anticipation (and no obviousness). Knights is silent as to any relationship between the "first region" (i.e., "higher temperature" region) and the gas diffusion at the gas diffusion electrode. The Examiner's logic seems misplaced.

First, Knights increases the width of the flow passage at the outlet as compared with the inlet. However, this structure is made in consideration of the fact that the reactant concentration decreases and the water content increases at the outlet. Knights intends to provide greater access to the catalyst layer and better water removal at the outlet by adopting this structure (*see* paragraph [0032] of Knights). There is no relation to this structure with the temperature distribution in the fuel cell stack.

Second, in the fuel cell stack of Knights, the gas diffusion would increase towards the outlet due to the above-mentioned flow passage structure. On the contrary, the temperature would become high at the center region of the fuel cell stack as in the conventional fuel cell stack.

Accordingly, Applicant respectfully submits that this means that Knights fails to disclose the feature of the present invention which configures the gas passages, the ribs, etc., so that the gas diffusion is improved in the recited "first region" (i.e., the higher temperature region).

V. Claims 12-20 Are Also Not Anticipated for the Same Reasons That Claim 11 Is Not Anticipated

Claim 11 is the only pending independent claim. Claims 12-20 are dependent claims to claim 1. Applicant respectfully submits that these claims are patentable for at least the same reasons as claim 11.

CONCLUSION

In view of the foregoing, it is respectfully submitted that the rejections of record should be reversed.

Respectfully submitted,

Date August 2, 2010

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CLAIMS APPENDIX

11. A fuel cell stack comprising a plurality of stacked unit cells, wherein each unit cell comprises:

a membrane electrode assembly in which gas diffusion electrodes are disposed on each side of a polymer electrolyte membrane; and

a separator comprising a plurality of ribs which contact the membrane electrode assembly to realize a current collecting function, and a plurality of gas passages formed between the ribs for supplying a gas to the gas diffusion electrode,

the fuel cell stack comprises a first region and a second region, with both the first region and the second region being located in the interior of the fuel cell stack thereof, the first region having a higher temperature than the second region, and

at least one of the gas passages, the ribs, and the gas diffusion electrode is constituted such that a gas diffusion through the gas diffusion electrode adjacent to the first region is improved beyond the gas diffusion through the gas diffusion electrode adjacent to the second region.

12. The fuel cell stack as defined in Claim 11, wherein the first region is a central region of a surface of the unit cell when seen from a stacking direction of the fuel cell stack, and the second region is a region on an outer side of the first region on the surface of the same unit cell.

13. The fuel cell stack as defined in Claim 11, further comprising a plurality of coolant passages through which a coolant flows onto a rear side of the gas passages,

wherein the first region is a region near an outlet from the coolant passages, and the second region is a region on the outer side of the first region.

14. The fuel cell stack as defined in Claim 11, wherein the first region comprises unit cells disposed in the center of the plurality of stacked unit cells, and the second region comprises unit cells disposed on the outer side of the unit cells disposed in the center.

15. The fuel cell stack as defined in Claim 11, wherein a sectional area of the gas passages adjacent to the first region is larger than the sectional area of the gas passages adjacent to the second region.

16. The fuel cell stack as defined in Claim 15, wherein the sectional area of the gas passages adjacent to the first region increases toward a downstream side.

17. The fuel cell stack as defined in Claim 11, wherein a width of the ribs adjacent to the first region is smaller than the width of the ribs adjacent to the second region.

18. The fuel cell stack as defined in Claim 17, wherein the width of the ribs adjacent to the first region decreases toward the downstream side.

19. The fuel cell stack as defined in Claim 11, wherein a porosity of the gas diffusion electrode adjacent to the first region is greater than the porosity of the gas diffusion electrode adjacent to the second region.

20. The fuel cell stack as defined in Claim 19, wherein a mixture containing carbon is coated in a smaller amount onto the gas diffusion electrode adjacent to the first region than the gas diffusion electrode adjacent to the second region.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.